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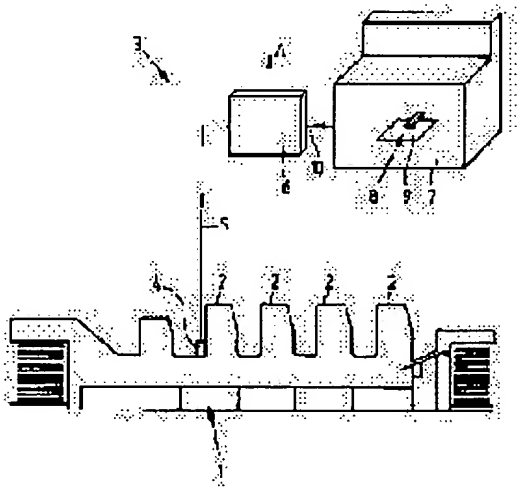
(54) PRINT QUALITY MONITORING DEVICE FOR PRINTING MACHINE

(57)Abstract:
PURPOSE: To provide a cost effective print quality monitoring device that has a high level monitoring function.
CONSTITUTION: In a device that monitors print quality of a printing machine, a second optical sensor 8 scans, in synchronization with a first optical sensor 4, a reference print product 9 corresponding to the printed image, and sends target values. A comparator 6 performs real-time processing of the data flows supplied by the two sensors 4, 8.



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CLAIMS

[Claim(s)]
[Claim 1] Have the 1st photo sensor which scans the printing picture of the printing result which actually supplies value data, have a comparator further, and this comparator actually compares value data with predetermined desired value. In the equipment which supervises the printing quality in the printing result of a printing machine of form of generating a removal signal if the deflection which is not actually permitted between value data and desired value data exists From the 2nd optical sensor (8) which scans the criteria printed matter (9) which ****s in a printing picture synchronizing with the 1st optical sensor (4) Printing performance-monitoring equipment in the printing result of the printing machine with which desired value data are sent out and a comparator (6) is further characterized by carrying out real-time processing of the data style supplied from the sensor (4 8) of above both.
[Claim 2] a sensor (4 8) -- a scan -- every line -- and/or, the equipment according to claim 1 carried out for every train
[Claim 3] Equipment according to claim 1 or 2 with which the 2nd sensor (8) is formed in the criteria printing preparation feeder (7) separate from a printing machine (1).
[Claim 4] Equipment according to claim 1 or 2 with which the 2nd sensor (8) is formed in the criteria printing preparation feeder (7) prepared in the interior of a printing machine (1).
[Claim 5] Equipment given [to claims 1-4] in any 1 term with which the 1st sensor (4) is formed in the interior of a printing machine (1) so that the 1st sensor (4) can scan the printing picture of the printing result which exists all over the usual printing conveyance way.
[Claim 6] Have the 1st photo sensor which scans the printing picture of the printing result which actually supplies value data given [to claims 1-5] in any 1 term, have a comparator further, and this comparator actually compares value data with predetermined desired value. In the method of supervising the printing quality in the printing result of a printing machine of form of generating a removal signal if the deflection which is not actually permitted between value data and desired value data exists From the 2nd optical sensor which scans the criteria printed matter which ****s in a printing picture synchronizing with the 1st optical sensor The printing performance-monitoring method in the printing result of the printing machine which desired value data are sent out and is further characterized by carrying out real-time processing of the data style supplied from the sensor of both above [a comparator].

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention has the 1st photo sensor which scans the printing picture of the printing result which actually supplies value data, it has a comparator further, and this comparator is related with the equipment which supervises the printing quality in the printing result of a printing machine of form of generating a removal signal if the deflection which is not actually permitted between value data and desired value data in value data as compared with predetermined desired value exists.
[0002] It is a regular interval to be needed in order to supervise the printing quality of the printing result of a printing machine, and it is comparing a printing result with criteria. A printing result is satisfactory when the deflection between the printing pictures and criteria printings which should be inspected is within the limits of an allowable error. The technical equipment which operates on an automatic target with the printing machine itself can perform this comparison. This equipment has the sensor which actually supplies value data to a comparator, in order to scan the printing picture of a printing result. The predetermined desired value of criteria printing is further supplied to a comparator. If deflection actually nonpermissible between a value and desired value arises, a removal signal will be generated, namely, let a printing result be printing waste.
[0003] The automatic quality-of-image surveillance machine to the bank note and negotiable securities which were just printed is shown in the Federal Republic of Germany patent application public presentation official report No. 2921862. In the case of this machine, quality-of-image inspection is conducted by scanning a printing result by the sensor which actually supplies value data. In this case, value data are actually compared with the desired value data memorized in electronic memory. This desired value data expresses criteria data.
[0004] The method of measuring a gap of a picture is shown in the Federal Republic of Germany patent application public presentation official report No. 2553721. A picture is scanned optically and value data are actually generated in this case. This actual value data is compared with the desired value data sent out out of electronic memory.
[0005] An actual picture is scanned optically electronically by much scanning points, and the case of the optical surface-analysis method shown in the Federal Republic of Germany patent application public presentation official report No. 3314465 is compared with the criteria image data memorized further. Reference-value data are memorized as software.
[0006] In the case of the picture comparison method and equipment which are finally shown in the Federal Republic of Germany patent application public presentation official report No. 3714011, value data are actually detected by the sensor and desired value data are further sent out out of a data group. The information which is not actually lacked by comparison with value data and desired value data is supplied.
[0007] Electronic memory is used for the purpose of criteria supply of a criteria picture which is clear from the above-mentioned conventional technology. The memory location needed for sufficient nature surveillance of a picture is latus to the extent that this kind of semiconductor memory becomes remarkably expensive. Therefore, as everyone knows, before memorizing the desired value data of a criteria picture, a lot of remarkable information reduction is performed, consequently only a suitable still fewer number of memory locations are needed. However, information reduction will lower the level of the demand to quality-of-image surveillance.
[0008] Furthermore, to the processing in which electronic storage-ization of the desired value data of a criteria picture needs suitable calculation time, therefore no stagnation is, the quick memory access method is needed and is accompanied by costs with this suitable.
[0009]
[Problem(s) to be Solved by the Invention] The technical problem of this invention is offering the equipment stated to the beginning which has a viewpoint and the printing quality-of-image monitoring function of level high under the advantageous composition in cost.
[0010]
[Means for Solving the Problem] This technical problem is solved as follows by this invention. That is, from the 2nd optical sensor which scans the criteria printed matter which ****s in a printing picture synchronizing with the 1st optical sensor, desired value data are sent out and a comparator carries out further real-time processing of the data style supplied from the sensor of above both.
[0011] Unlike the composition of the conventional technology, desired value data are not filed in electronic memory, and it is generated by the scan using an optical sensor from the printing picture of criteria printing during printing quality-of-image surveillance. The printing picture of a printing result is simultaneously scanned synchronizing with a suitable optical sensor,

therefore two data styles are generated. One data style is generated from the actual value of the sensor which scans the 1st printing result, and the data style of another side consists of the desired value data sent out from the sensor which scans criteria printing. By this invention, a comparator carries out real-time processing of the data style supplied simultaneously. In this case, it responds to the resolution of - request, and the amount of data accompanying it. - The printing quality-of-image surveillance of a high level can be carried out suitably. Therefore, the expensive electronic memory apparatus for criteria data is not needed. The memory which criteria picture memory is used according to not the criteria data filed in electronic data memory but this invention, namely, has the actual printing picture of an errorless model as a criteria picture is used.

[0012] according to the composition of this invention -- a sensor -- a scan -- every line -- and/or, it carries out for every train Therefore, the whole field of the printing picture of criteria printing of a printing result is not detected at once, but the scan of a partial side is performed. For the purpose of a perfect operation, it is carried out by the scan of both sensors synchronizing. The suitable control unit is formed for this purpose.

[0013] For example, the 2nd sensor is formed in the criteria printing preparation feeder separate from a printing machine. Preparation supply is carried out and the printing sheet which expresses criteria printing in this equipment is scanned for the purpose of supply of desired value data by the 2nd sensor. A comparator can also be prepared into this criteria printing preparation feeder.

[0014] However, the 2nd sensor can also be alternatively formed into the criteria printing preparation feeder in which it is prepared inside the printing machine. In this case, the printing machine itself has equipment for printing quality-of-image surveillance.

[0015] For example, the 1st sensor is formed in the interior of a printing machine so that the printing picture of the printing result to which this sensor exists all over the usual printed matter conveyance way can be scanned. This has the following advantage. That is, although only printing process is interrupted by the purpose of printing quality-of-image surveillance, the just printed printing result which should be inspected in this case has the advantage which is left behind all over a printing conveyance way, namely, does not have the need of taking out outside. As long as the inspected printing result next has perfect;, therefore - printing result of which - conveyance is done as usual like [in - printing continuation] after the end of performance monitoring, - printing result is set still in this product cycle.

[0016] this invention carries out the object also of the printing performance-monitoring method in the printing result of the printing machine of the next composition further. Namely, have the 1st photo sensor which scans the printing picture of the printing result which actually supplies value data, have a comparator further, and this comparator actually compares value data with predetermined desired value. In the method of supervising the printing quality in the printing result of a printing machine of form of generating a removal signal if the deflection which is not actually permitted between value data and desired value data exists From the 2nd optical sensor which scans the criteria printed matter which ****s in a printing picture synchronizing with the 1st optical sensor Desired value data are sent out and a comparator also makes an object further the printing performance-monitoring method in the printing result of the printing machine characterized by carrying out real-time processing of the data style supplied from the sensor of above both.

[0017]

[Example] Drawing 1 shows the printing machine constituted as the sheet offset press. A printing machine 1 has two or more print stations 2. The equipment which supervises printing quality is assigned to the last print station 2. The 1st optical sensor 4 is formed in the field of the printing conveyance way of the last print station 2. the printing picture of the printing result by which this sensor was just [suitable] printed at the time of a printing halt -- every line -- and/or, it can scan for every train In this scan, the 1st sensor 4 supplies the suitable actual value data which **** in a printing result. This actual value data minds a line 5, and is ********** to a comparator 6.

[0018] Furthermore, drawing 1 shows the criteria printing preparation feeder 7 with a separate printing machine 1. This equipment has in detail the 2nd optical sensor 8 which is not shown. This sensor scans the criteria printing 9 which ****s in the printing picture of a printing result synchronizing with movement of the 1st sensor 4. The model which is errorless as criteria printing 9 is used.

[0019] A data style is generated from the 1st and the 2nd sensor 4 and 8 by synchronous scan, these data styles mind a line 5 and a line 10, and it is ********** to a comparator 6. A comparator 6 is real-time processing and compares the data of the supplied data style. Therefore, the actual value data of **** 1 sensor 4 are compared with the desired value data of affiliation of the 2nd sensor 8 each time. In this case, it is judged with having no problem in the case of the deflection within coincidence or predetermined tolerance, and when another side and deflection actually nonpermissible between value data and desired value data exist, the removal signal A is generated. This removal signal A is the purpose which removes a suitable printing result as printing waste, and is used.

[0020] The example of drawing 1 is the point that the criteria printing preparation feeder 7 is formed in the interior of a printing machine 1, and the examples of drawing 2 differ. This composition has the advantage to which installation of an additional unit is abbreviated. Of course, a comparator 6 can also be attached into a printing machine 1.

[0021] The surveillance of printing quality is carried out by picture comparison by this invention, and two synchronized sensors and an original picture subject copy are used for the purpose of picture comparison in this case. A model sheet without the printed error is used in criteria picture memory (criteria printing preparation feeder 7). Comparison is carried out by real-time processing in a comparator 6. Therefore, an expensive electronic memory apparatus is not needed. In the case of the solution means by this invention, it is remarkable quick access to a data group that it is especially advantageous. In this case, access to both data groups (actually value data and desired value data) is performed with the same speed. Furthermore, resolution and trimming have the

advantage which puts in quickly and can **.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the drawing of the equipment by the 1st example.
[Drawing 2] It is the drawing of the equipment by the 2nd example.
[Description of Notations]
1 Printing Machine
2 Print Station
3 Printing Performance-Monitoring Equipment
4 Eight Optical sensor
5 Ten Track
6 Comparator
7 Criteria Printing Preparation Feeder
9 Criteria Printing

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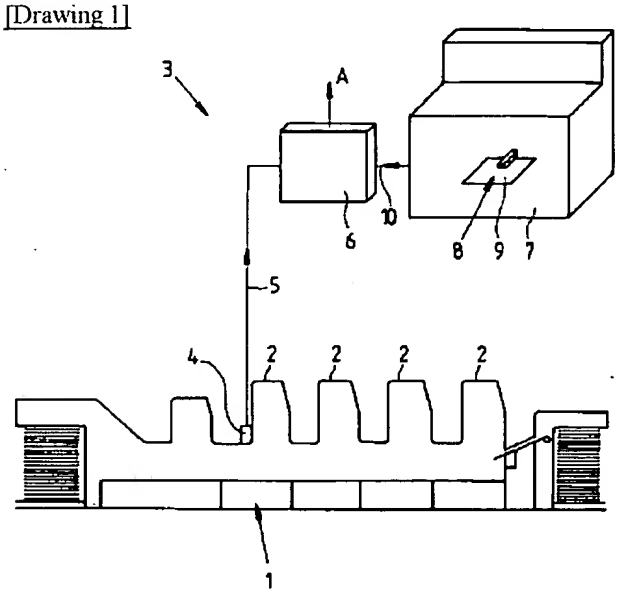
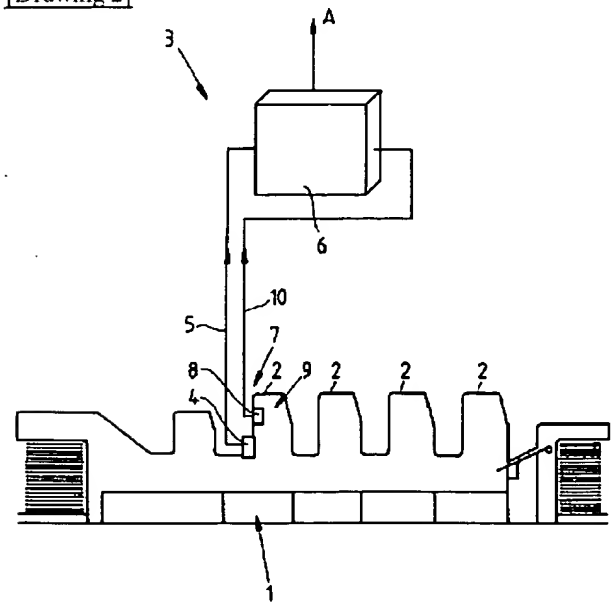
DRAWINGS

[Drawing 1]



[Drawing 2]



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